



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/891,200	06/26/2001	Eugene S. Smotkin	491712000100	9382
25227	7590	08/18/2004	EXAMINER	
MORRISON & FOERSTER LLP 1650 TYSONS BOULEVARD SUITE 300 MCLEAN, VA 22102			ALEJANDRO, RAYMOND	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/891,200	SMOTKIN, EUGENE S.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Raymond Alejandro	1745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 75-92 is/are pending in the application.
- 4a) Of the above claim(s) 83 and 92 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 74-82 and 84-91 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/26/04 has been entered.

This submission is in reply to the aforementioned RCE and its associated amendment of 07/26/04. The applicant has overcome the art rejections. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments. However, the newly submitted claims 75-82 and 84-91 (as all original claims have been cancelled) are newly rejected over art as seen below and for the reasons of record.

### ***Election/Restrictions***

1. Applicant's cancellation of claims 1-74 in the reply filed on 07/26/04 is acknowledged.
2. Newly submitted claims 83 and 92 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 83 and 92 are drawn to invention methods to prepare components classified in class(es) 29/592.1, 623.5 and/or 427/255.11 while claims 75-82 and 84-91 are directed to a coated component classified in class 429/34 and 427/115. Accordingly, the inventions of claims 83/92 and 75-82/84-91 are related as process of making and product made; and they are distinct because the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the

Art Unit: 1745

coated component can be made by dip coating, brush coating, sputtering, vapor deposition and the likes.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 83 and 92 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Specification***

3. The amendment filed 07/26/04 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material, which is not supported by the original disclosure, is as follows: (claims 75-77, 80-81, 84-86 and 89-90) “*a metal or metal hydride support*”. It is noted that while the original specification does support the use of a metal hydride support, the specification fails to clearly disclose the use of an elemental metal as the support material. For example, the specification simply recites the following: (at page 17, lines 5-7) “*...a metal hydride support*” or “*...the metal hydride support*”; (at page 19, lines 3-5) “*...the metal hydride is selected from the group consisting of Pd, a Pd alloy, V/Ni/Ti, V/Ni, V/Ti, PdAg, PdCu, Ti, LaNi<sub>5</sub>, TiFe and CrV<sub>2</sub>.*”; (at page 23, lines 9-11) “*Metal hydride foils comprises of materials...*”; (at page 27, lines 17-20) “*...the material comprises a foil of a metal hydride. An example of a metal hydride foil is...*”. For that reason, it is contended that such claim language intending to recite that the support is made of an elemental metal per se is unsupported by the

Art Unit: 1745

original specification because the specification simply enables the use metal hydride supports.

Applicant is required to cancel the new matter in the reply to this Office Action.

4. The use of the trademark "Nafion" has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

#### ***Claim Objections***

5. Claims 75, 78-79, 84, 87-88 are objected to because of the following informalities: all parenthesis (punctuation marks) (e.g. "(ASR)", "(EIPC)", "(W-PTA)" and the likes) and abbreviations (e.g. "ASR", "EIPC", "W-PTA", "BCN" and the likes) should be deleted and/or presented in their generic terminologies so as to better reflect the intended scope of the claims. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 75-82 and 84-91 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the

relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows: (claims 75-77, 80-81, 84-86 and 89-90) "a metal or metal hydride support". It is noted that while the original specification does support the use of a metal hydride support, the specification fails to clearly disclose the use of an elemental metal as the support material. For example, the specification simply recites the following: (at page 17, lines 5-7) "...a metal hydride support" or "...the metal hydride support"; (at page 19, lines 3-5) "...the metal hydride is selected from the group consisting of Pd, a Pd alloy, V/Ni/Ti, V/Ni, V/Ti, PdAg, PdCu, Ti, LaNi<sub>5</sub>, TiFe and CrV<sub>2</sub>."; (at page 23, lines 9-11) "Metal hydride foils comprises of materials..."; (at page 27, lines 17-20) "...the material comprises a foil of a metal hydride. An example of a metal hydride foil is...". For that reason, it is contended that such claim language intending to recite that the support is made of an elemental metal per se is unsupported by the original specification because the specification simply enables the use metal hydride supports. Applicant is required to cancel the new matter in the reply to this Office Action.

8. Claims 78 and 87 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is noted that the specification fails to clearly define the specific molar amounts "z", "y", "w" and "x" for the superprotonic water non-stoichiometric phase of  $M_zH_y(AO_4)_w \cdot xH_2O$ ; and the molar amount "x" and the component "D" for the inorganic system without water comprising  $Cs_{1-x}(NH_4)_xH_2PO_4$ ,

Art Unit: 1745

$\text{Cs}_{1-x}(\text{ND}_4)_x\text{D}_2\text{PO}_4$ , or  $\text{K}_{1-x}(\text{NH}_4)_x\text{H}_2\text{PO}_4$ . Thus, the specification does not clearly set forth the metes and bounds of the patent protection desired.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 78, 82, 87 and 91 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Claims 82 and 91 contain the trademark/trade name "*Nafion 117*". Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade name is used to identify/describe the proton-conducting material and, accordingly, the identification/description is indefinite.

12. Claim 84 is indefinite because it incorporates by reference the content of Figure 1, thereby rendering the scope of the claim indefinable, vague and imprecise. Applicant's attention is kindly directed to *MPEP 2173.05(s): Reference to Figures or Tables* which explains that under an exceptional circumstance such reference is permitted. Accordingly, in this instance, it

Art Unit: 1745

appears that such incorporation by reference is for applicant's convenience rather than an absolute necessity. *See also MPEP § 608.01(m)*.

***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 75-77, 82, 84-86 and 91 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Smotkin et al 5846669.

The present application is now directed to a component wherein the disclosed inventive concept comprises the coated support.

Regarding claims 75, 82, 84 and 91:



Smotkin et al disclose an electrolyte system for fuel cells comprising an acid electrolyte, a base electrolyte and a proton permeably dense phase separating the acid electrolyte from the base electrolyte (ABSTRACT). Smotkin et al disclose that their invention relates to electrolyte system for fuel cells operating in a temperature range up to about 300 °C (COL 1, lines 10-15).

**Figure 1** below illustrates the dense phase proton permeable material 17 separating acidic electrolyte-containing matrix layer 15 from basic electrolyte-containing matrix layer 16 (FIGURE 1/ COL 4, lines 44-55). It is disclosed that the dense phase proton permeably material comprises a foil of a metal hydride (COL 4, lines 57-64/ COL 3, lines 12-18). *Thus, the metal hydride foil serves as the support which is coated on both sides by respective electrolyte containing matrixes which represents the inorganic/composite non-liquid material.*

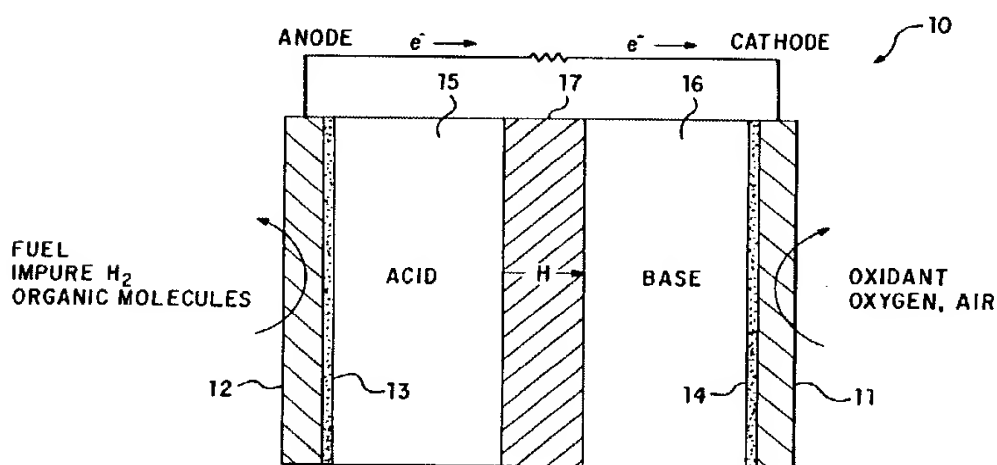


FIG. 1

**First Examiner's Note:** *since the recited "coating material" (i.e. "the inorganic or composite non-liquid material") covers a very large number of applicable materials which can be used therefor, it is also contended that "a coating material" comprising any non-liquid material would produce a component exhibiting the area-specific resistance (ASR) at the specific temperature range. Thus, such area-specific resistance (ASR) is an inherent characteristic or*

Art Unit: 1745

*property of the respective electrolyte containing matrixes representing the inorganic/composite non-liquid material. That is, materials of at least similar compositions (i.e. any inorganic or composite non-liquid material) would be expected to have at least similar properties (See **MPEP 2112: Requirements of Rejection Based on Inherency; Burden of Proof**). Thus, the prior art coated component seems to be identical except that the prior art is silent as to an inherent property and/or characteristic. In that, it is noted that the extrinsic evidence makes clear that the missing descriptive matter is necessarily present in coated component described in the reference, and that it would be so recognized by persons of ordinary skill.*

**Second Examiner's Note:** *as to the specific preamble reciting "designed to serve as an electrolyte in a fuel cell", it is pointed out that the preamble refers to intended use. That is, the claim is directed to any component per se and such preamble is only a statement of ultimate intended utility.*

Regarding claims 76-77 and 85-86:

Smotkin et al teaches the use of palladium hydride as the metal hydride foil (COL 4, lines 56-65).

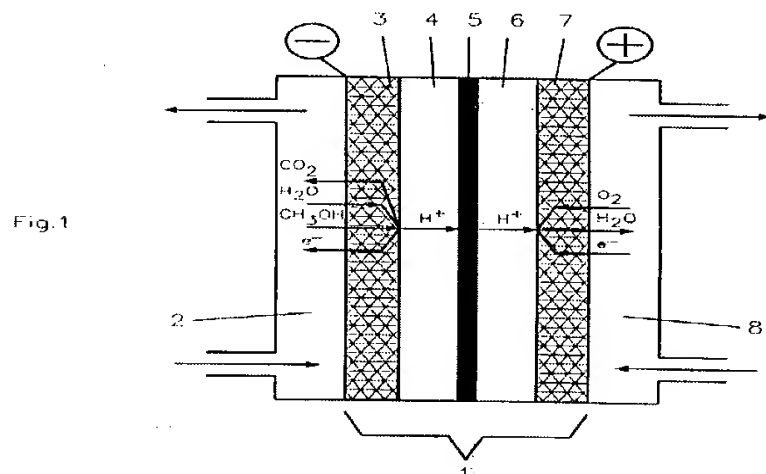
Therefore, the claims are anticipated by Smotkin et al'669. However, if the claims are not anticipated the claims are obvious as it has been held similar products claimed in terms of its function, property and/or characteristic are obvious. *In re Best 195 USPQ 430 and In re Fitzgerald 205 USPQ 594*. See rationale and/or technical reason above to reasonably support the determination that the inherent function and/or characteristic necessarily flows from the teaching of the applied prior art.

16. Claims 75-77, 80-82, 84-86 and 89-91 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over the WO 98/21777 publication (herein called "*the WO'777 publication*").

Regarding claims 75, 82, 84 and 91:

The WO'777 publication discloses a fuel cell electrode-electrolyte unit wherein the electrolyte is divided up into two electrolyte layers 4, 6 with a blocking layer 5 therebetween (ABSTRACT). The blocking layer is made from a palladium silver alloy. The electrolyte unit is suitable for fuel cells (ABSTRACT).

**Figure 1** below illustrates the palladium silver alloy foil layer 5 the two non-liquid electrolyte layers 4 and 6 (FIGURE 1). *Thus, the palladium silver alloy foil layer serves as the support which is coated on both sides by respective electrolyte layers which represents the inorganic/composite non-liquid material.*



**First Examiner's Note:** *since the recited "coating material" (i.e. "the inorganic or composite non-liquid material") covers a very large number of applicable materials which can be used therefor, it is also contended that "a coating material" comprising any non-liquid material would produce a component exhibiting the area-specific resistance (ASR) at the specific temperature range. Thus, such area-specific resistance (ASR) is an inherent characteristic or*

Art Unit: 1745

*property of the respective electrolyte containing matrixes representing the inorganic/composite non-liquid material. That is, materials of at least similar compositions (i.e. any inorganic or composite non-liquid material) would be expected to have at least similar properties (See MPEP 2112: Requirements of Rejection Based on Inherency; Burden of Proof). Thus, the prior art coated component seems to be identical except that the prior art is silent as to an inherent property and/or characteristic. In that, it is noted that the extrinsic evidence makes clear that the missing descriptive matter is necessarily present in coated component described in the reference, and that it would be so recognized by persons of ordinary skill.*

**Second Examiner's Note:** *as to the specific preamble reciting "designed to serve as an electrolyte in a fuel cell", it is pointed out that the preamble refers to intended use. That is, the claim is directed to any component per se and such preamble is only a statement of ultimate intended utility.*

As to claims 76-77 and 85-86:

The WO'777 publication divulges that the blocking layer (the support) is made from a palladium silver alloy (ABSTRACT).

With reference to claims 80-81 and 89-90:

The WO'777 publication teaches that the palladium-silver layer has a thickness ranging from 5-50  $\mu\text{m}$  (page 4, lines 1-2/ page 5, lines 10-15). *In this case, it is noted that, at least, the end points (i.e. 5  $\mu\text{m}$  and/or 50  $\mu\text{m}$ ) also constitute a valid date point and thus it anticipates the claim as the end point represents a specific disclosure of a discrete embodiment of the invention disclosed by the prior art which amounts to a complete description and, therefore, an anticipation of the claimed range. See Ex Parte Lee 31 USPQ2d 1105.*

Therefore, the claims are anticipated by the WO'777 publication. However, if the claims are not anticipated the claims are obvious as it has been held similar products claimed in terms of its function, property and/or characteristic are obvious. *In re Best 195 USPQ 430 and In re Fitzgerald 205 USPQ 594*. See rationale and/or technical reason above to reasonably support the determination that the inherent function and/or characteristic necessarily flows from the teaching of the applied prior art.

17. Claims 75-77, 80-82, 84-86 and 89-91 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Saito et al 2002/0034672.

Regarding claims 75, 82, 84 and 91:

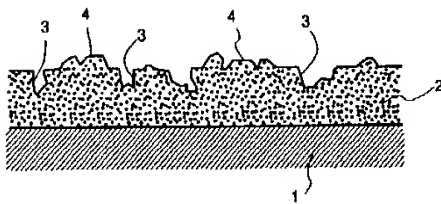
Saito et al disclose a separator (*it is noted that the separator represents the component*) for a fuel cell having a film on the surface (ABSTRACT). Saito et al further disclose that the base material for the fuel cell separator is a metal and/or a coated separator material obtained by coating the separator material with a noble metal (SECTION 0035). It is disclosed that the fuel cell separator, in general, comprises a conductive coating of particular composition onto a base material having a fuel cell separator shape, to form on the base material, a film made of conductive coating (SECTION 0020). The conductive coating comprises a conductive powder, a binder and a perishable additive (SECTION 0021). *Thus, the conductive coating satisfies the requirement of being a composite non-liquid material (the composite formed of the conductive powder, the binder and the additive) as well as being an inorganic non-liquid material (i.e. the noble metal coating).*

Art Unit: 1745

Saito et al further shows in **TABLE 10** separators having an electrical resistance ranging from 1000-1600 mΩ/cm<sup>2</sup> (*that is, 1.0-1.6 Ω/cm<sup>2</sup>*)(See TABLE 10)

**Figure 1** below illustrates the metal separator base material 1 having a film 2 on at least one face thereof (FIGURE 1). *Thus, the base material serves as the support which is coated on one face (side) by respective conductive-based film representing the inorganic/composite non-liquid material.*

Fig.1



**First Examiner's Note:** *since the recited "coating material" (i.e. "the inorganic or composite non-liquid material") covers a very large number of applicable materials which can be used therefor, it is also contended that "a coating material" comprising any non-liquid material would produce a component exhibiting the area-specific resistance (ASR) at the specific temperature range. Thus, such area-specific resistance (ASR) is an inherent characteristic or property of the respective electrolyte containing matrixes representing the inorganic/composite non-liquid material. That is, materials of at least similar compositions (i.e. any inorganic or composite non-liquid material) would be expected to have at least similar properties (See MPEP 2112: Requirements of Rejection Based on Inherency; Burden of Proof). Thus, the prior art coated component seems to be identical except that the prior art is silent as to an inherent property and/or characteristic. In that, it is noted that the extrinsic evidence makes clear that the missing descriptive matter is necessarily present in coated component described in the reference, and that it would be so recognized by persons of ordinary skill.*

*Second Examiner's Note: as to the specific preamble reciting "designed to serve as an electrolyte in a fuel cell", it is pointed out that the preamble refers to intended use. That is, the claim is directed to any component per se and such preamble is only a statement of ultimate intended utility.*

As to claims 76-77 and 85-86:

Saito et al divulges the metal separator material is titanium or stainless steel (SECTION 0035). *It is noted that stainless steel is an alloy of steel with chromium and sometimes another element as nickel.*

With reference to claims 80-81 and 89-90:

Saito et al further discloses that the separator has a thickness of 0.5-300  $\mu\text{m}$  (SECTION 0042/ CLAIMS 1-2).

Therefore, the claims are anticipated by Saito et al'672. However, if the claims are not anticipated the claims are obvious as it has been held similar products claimed in terms of its function, property and/or characteristic are obvious. *In re Best 195 USPQ 430 and In re Fitzgerald 205 USPQ 594.* See rationale and/or technical reason above to reasonably support the determination that the inherent function and/or characteristic necessarily flows from the teaching of the applied prior art.

### ***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 78-79 and 87-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smotkin et al 5846669 as applied to claim 75 and 84 above, and further in view of the publication "Solid-State protonic conductors: principles, properties, progress and prospects" by T.Norby (hereinafter referred to as "*the Norby's publication*").

Smotkin et al'669 is applied, argued and incorporated herein for the reasons above.

However, Smotkin et al'669 does not expressly disclose the specific proton conductor material.

The Norby's publication teaches a solid-state protonic conductor (TITLE) which can be used in a fuel cell as a hydrogen permeable membrane (ABSTRACT). It is disclosed that protonic conductivity are candidates for electrolyte in fuel cells (INTRODUCTION). Norby discloses protonic conductors are electrolyte in which hydrogen is transported towards and evolved at the cathode. It is further disclosed that protonic transport includes transport of protons and any assembly that carries protons and/or proton exchange membranes (PEM) (Sections: 2. Principles of Protonic Conduction-Classes of Proton Conductors, & 4.1 Water-containing Systems: PEMs). The Norby's publication reveals that  $\text{Ba}_3\text{Ca}_{1.18}\text{Nb}_{1.82}\text{O}_{8.73}$  (BCN18) shows proton conduction (Section: 3. PROPERTIES). It is disclosed the use of hydrate  $\text{CsHSO}_4$  (SECTION: 2. Principles of Protonic Conduction- Classes of Proton Conductors/ FIGURE 1); and  $\text{SrHPO}_4$ ,  $\text{Sr}(\text{H}_2\text{PO}_4)_2$ , and  $\text{Ba}(\text{H}_2\text{PO}_4)_2$  (SECTION: 4.2 Low-Temperature inorganic proton conductors)

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific proton conductor material of the Norby's publication on the metal substrate base of Smotkin et al'669 because the Norby's publication discloses that such



Art Unit: 1745

specific proton conductor materials are suitable solid-state protonic conductors which can be used in fuel cell applications such as hydrogen permeable membranes. Accordingly, such specific proton conductor material enhances the transport of protons for both chemical processes and energy conversion process (Section: 3. Properties).

20. Claims 78-79 and 87-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smotkin et al 5846669 as applied to claim 75 and 84 above, and further in view of Crome et al 5985113.

Smotkin et al'669 is applied, argued and incorporated herein for the reasons above. However, Smotkin et al'669 does not expressly disclose the specific proton conductor material.

Crome et al also disclose the following:

As to claim 31:

Crome et al disclose the following (COL 9, lines 10-26):

For all described embodiments, it is envisioned that the electrolyte material can be selected from the following groups and mixtures thereof: 10

5) lanthanum gallate  $\text{La}_{1-x}\text{Sr}_x\text{Ga}_{1-y}\text{Mg}_y\text{O}_3$  where  $(0 < x < 0.30)$  (where  $x=0.10$  is preferred) and  $(0.00 < y < 0.30)$  (where  $y=0.20$  is preferred). 25

Crome et al also envision that the electrolyte material can be selected from a variety of element groups and mixtures thereof including scandium (Sc) (CLAIM 12/ COL 9, lines 10-26).

*Thus, it is asserted that scandium (Sc) can replace gallium (Ga) in the ceramic composite chemical formula.*

In view of this disclosure, it would have been obvious to one skilled in the art at the time the invention was made to use the specific proton conductor material of Crome et al on the metal

substrate base of Smotkin et al'669 as Crome et al teaches that, for all described embodiments, it is envisioned that the electrolyte material can be selected from a variety of groups and mixtures including an alternative use of scandium element (Sc) as this allows the fuel cell stack to operate in multiple temperature regions including the claimed temperature range and provides efficiency power systems. Moreover, Crome et al directly teach that scandium (Sc) can be a doping element which might substitute or replace any element in electrolyte composite materials. Further, those of ordinary skill in the art knows that scandium (Sc) element may be a substitute element in composite materials as both elements Sc and Ga shows the same chemical valence.

21. Claims 78-79 and 87-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smotkin et al 5846669 as applied to claim 75 and 84 above, and further in view of the publication "Chemical stability and proton conductivity of doped BaCeO<sub>3</sub>-BaZrO<sub>3</sub> solid solutions" by Kwang Hyun Ryu et al (hereinafter referred to as "*the Kwang's publication*").

Smotkin et al'669 is applied, argued and incorporated herein for the reasons above. However, Smotkin et al'669 does not expressly disclose the specific proton conductor material.

The Kwang's publication teaches solid solutions such as BaCe<sub>0.9-x</sub>Zr<sub>x</sub>M<sub>0.1</sub>O<sub>3-δ</sub> where M is Gd or Nd and x ranges from 0-0.4 (ABSTRACT). It is disclosed that this composition gives a good compromise between conductivity and stability for fuel cell applications (ABSTRACT).

In light of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the solid composition of the Kwang's publication as the specific proton conducting material on the metal substrate base of Smotkin et al'669 because the Kwang's publication teaches this composition gives a good compromise between conductivity

Art Unit: 1745

and stability for fuel cell applications as it has been found that this composite compound exhibits both high conductivity, good stability and an increased in the activation energy for proton transport.

22. Claims 78-79 and 87-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smotkin et al 5846669 as applied to claim 75 and 84 above, and further in view of the publication "Proton and oxide ion conductivity of doped LaScO<sub>3</sub>" by Dorthe Lybye et al (hereinafter referred to as "*the Dorthe's publication*").

Smotkin et al'669 is applied, argued and incorporated herein for the reasons above. However, Smotkin et al'669 does not expressly disclose the specific proton conductor material.

The Dorthe's publication teaches that conductivity of La<sub>0.9</sub>Sr<sub>0.1</sub>Sc<sub>0.9</sub>Mg<sub>0.1</sub>O<sub>3</sub> has been studied (ABSTRACT), particularly at 400°C (Section: 2. EXPERIMENTAL). It is also disclosed that the conductivity measurements suggests that La<sub>0.9</sub>Sr<sub>0.1</sub>Sc<sub>0.9</sub>Mg<sub>0.1</sub>O<sub>3</sub> is also a proton conductor (Section: 3. RESULTS and DISCUSSIONS).

In light of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the compound of the Dorthe's publication as the specific proton conducting material on the metal substrate base of Smotkin et al'669 because the Dorthe's publication teaches that such compound exhibit excellent proton conduction at temperatures below 700°C. Accordingly, the specified compound is a proton conductor showing satisfactory ionic conductivity.

***Response to Arguments***

23. Applicant's arguments, see the amendments filed 07/26/04 for specific details, have been fully considered and are persuasive. However, upon further consideration, new grounds of rejection have been set forth hereinabove. Accordingly, applicant's arguments with respect to newly submitted claims 75-82 and 84-91 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro  
Examiner  
Art Unit 1745

A handwritten signature in black ink, appearing to read 'RAYM', with a long, sweeping horizontal stroke underneath.